

# Measuring Contract Performance Using Earned Value Management<sup>1</sup>

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## ABSTRACT

Contract management plays a vital role in a successful project. Majority projects closed out of scheduled date, budget, or efforts, which results in a huge loss of the organization. In this case, contract management is extensively studied by authority institutions. However, measuring the contract performance is often overlooked, since when they carrying a project, they also push the team member to work harder to meet the requirement, and when a project close successfully, the organizations will allocate another project as soon as possible. They often ignore ‘lessons learned’, in which measuring contract performance could be helpful to increase the working efficiency and effect. Even if a project failed, to measure the contract performance would support them to achieve the goal, because disputes in the contract are the roots of project failure. Regarding this, the author will highlight this problem, and give a thorough analysis of this problem and provide a practical tool to measure the contract performance. After that, the organization will be able to define an accurate scope, and monitor the contract performance in response to the contingency.

**Key words:** Control, Measure, Performance, Scope, Cost, Schedule, Resources, Activities

## INTRODUCTION

Earned Value Performance Management (EVPM) is a method to measure the cost and schedule performance through an entire project lifecycle. It gives the project team opportunities to be visible to the cost and schedule issues, which is to be specific, to predict the delivery time and the actual cost comparing to the schedule and the contract, in order to reduce uncertainty, and support contract-making process, etc. From the Agile perspective, ‘time and cost are fixed’, because if the deliverable date and the actual cost beyond the planned cost, it would result in a consequential risk to the success of the project or even damage the whole organization, such as bankruptcy. Since EVPM has been firstly introduced by U.S Air Force in 1966, this approach is widely used by the project-oriented companies, as time and cost are vital variables to a successful project, specifically in contract management and cost management.

Contract management is one of the pillars to ensure the success of the project, as most organizations know; however, the measurement of contract performance in contract

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management is often overlooked. So as to the research on contract performance. Although there are many research results about contract strategy, management, etc., there are rare papers about measuring contract performance. There is a statistic indicating that 70% of the projects are over budget and behind schedule, and 52% of all projects finish at 189% of their initial budget. Regarding this, the author catches this opportunity by developing an innovative way to achieve measuring contract performance, by applying Earned Value Performance Management.

The use of EVPM in contract measurement can indeed benefit the contractor and the whole organization, such as making more accurate budgets and schedules at different stages in the contract. In this case, the author will highlight this problem, and give solution by applying the EVPM approach for measuring contract performance to improve the contract management in a project.

To conclude, the objective of this report is to identify six aspects regarding EVPM in the contract measurement, which is what, why, who, when, where, and how to improve the performance of contract management and then measure the three main types of contracts which are generally used by organizations. The author will analysis these aspects orderly, review the benefits as well as the challenges, and assess the outcomes the article will bring to the public.

## **METHODOLOGY**

The author compared many powerful tools, and chose Multiple Attributes Decision Making (MADM) approach, since MADM is the most effective analysis method when it involves multiple criteria to consider. As for performance measurement in a project, there are many attributes, such as time, cost, quality, etc., and the EVPM already prioritizes two criteria, which are time and cost. Therefore, MADM can suit the author's requirements well. By using MADM, the author can weigh the importance of every factor and allocate preference of each alternative to support to make a further analysis based on the use of EVPM.

## **FINDINGS**

### **1. What is the role of Earned Value Performance Management in contract performance measurement?**

As the short brief in the introduction, originally EVPM is used to control a project. To be exact, providing references to the project team's decision making by highlighting schedule and cost issues early, and then predicting future performance trends. It ensures the project team has sufficient time to take actions to fix issues, which can minimize the impacts on the project.

Before the author goes further, let's see some basic terminology, 'the Budgeted Cost of Work Scheduled' (BCWS), 'The Budgeted Cost of Work Performed' (BCWP), and the 'The Actual Cost of Work Performed' (ACWP). These are key portions of EVPM curves, which the author will give more details in the following sector.

## **2. Why use EVPM to measure contract performance**

There are three main reasons:

Firstly, it not only provides an objective data metric to express the accomplished performance and the future trends, but also reflects the contract management process, which enables the project team to make the next stage plan or the program office to allocate the limited resource.

Secondly, it can show a direct result of the performance, which is well-understood by the owner and the contractor, and support the mutual goals of the contractor and the owner.

Last but not least, EVPM compares key factors in the contract, which would have a great influence on the contract performance, and provides important alternatives for MADM analysis approach.

## **3. Who can do this measurement in a project**

Technically, every management roles can do the measurement, such as contract administrator, project manager, business visionary, organization program office, etc. The user must be qualified and have available resource and accurate data to meet the basic EVPM requirement, according to different management needs.

## **4. When to apply EVPM on contract performance in a project**

There is no exact requirement about when to carry out the measurement. As the project proceeding, the performance of current contract needs to be reviewed by the project manager to present to organization program office. In this case, at some key checkpoint, the contract measurement need to be created to satisfied the management and control needs. One thing needs to be noticed that the contractor administration need to collect relative data continuously since the beginning of the contract.

## **5. Where can this measurement use**

Basically, measuring contract performance is needed in the long-term or big project, such as the government-level project or construction project, which involves many suppliers.

Another case is that for some types of contract, such as Fixed Price Incentive, Cost Plus Award Fee, the contract could be changed according to the performance. Applying contract performance measurement can maximize the benefit for both parties.

## **6. How to use this measurement approach**

- 1) Set the baseline: Normally the schedule is the baseline and comparing time with cost, hours and deliverable date.
- 2) Record progress against the baseline: Collecting key data once a week or once a month, which depends on the duration of the contract. The key data could be ‘costs to date’, ‘hours to date’...
- 3) Review progress and forecast: The forecasting need to be calculated, based on the rest of work packages, and the productivity to date.

## **7. The limitation of EVPM**

EVPM cannot be applied in measuring a contract that is not performance-based, such as Firm Fix Price contract (FFP), or the level-of-effort activities, which is a non-schedule based contract.

Also, the inappropriate use of EVPM will undermine the project, in the case of inadequate requirements definition, or inaccurate cost and schedule data.

## **8. The graphics curves of EVPM on measuring contract performance**

See figure 1 below.

Source: Giammalvo, Paul D (2015) Course Materials. Contributed under Creative Commons License BY v 4.0

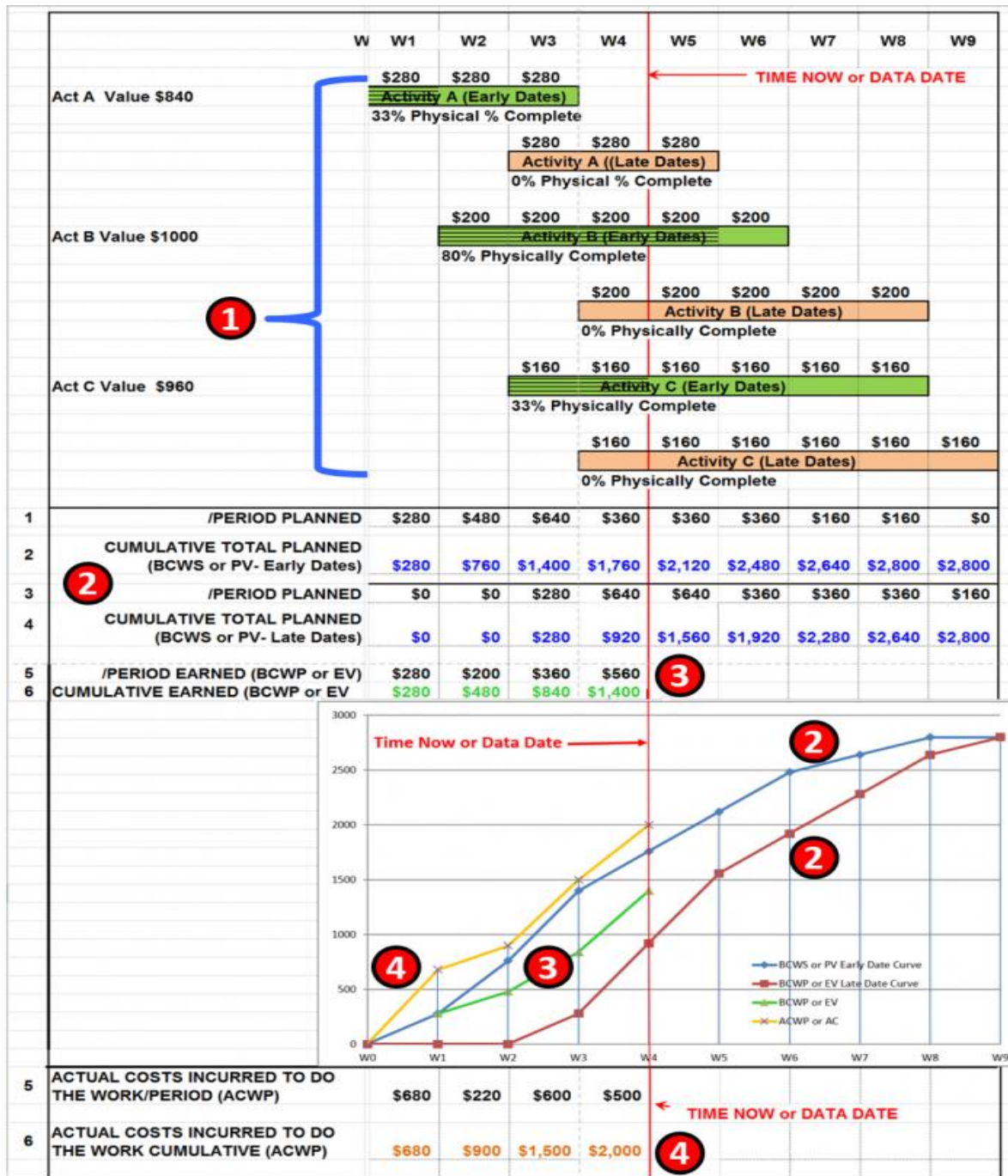


Figure 1<sup>2</sup>

This is a simple sample of how to use EVPM on measuring contract performance.

- Use data to measure the performance
- Provides a mean to estimate to Forecast the time and cost to accomplish

<sup>2</sup> Giammalvo, Paul D (2015) "Course Materials Contributed Under Creative Commons License BY v 4.0" < <http://www.planningplanet.com/guild/gpccar/introduction-to-managing-project-progress> >

- Variances in time and \$'s to date
- Indicate schedule and accomplish time, budget and actual cost

### **Feasible Alternatives:**

- Discrete Effort Methods: 'An activity that can be planned and measured and that yields a specific output.'<sup>3</sup>

- Apportioned Effort Methods: 'An activity where an effort is allotted proportionately across certain discrete efforts and not divisible into discrete efforts.'<sup>4</sup>

- The Level of Effort Methods: 'An activity that does not produce definitive end products and is measured by the passage of time, which can support discrete effort method and apportioned effort method.'<sup>5</sup>

These solutions are based on earned value management to record and measure the physical percentage completed during a project. Although there are no criteria to tell you which tool is the best for the given situation, the author will use multi-attributes decision making analysis approach to give a personal attitude towards them.

Since the most general contract types is Fix Price (FP), the author will take a few words at measuring FP contract.

### **Attributes selection:**

The Requirement of cost: the need to compare and record budgeted cost and actual cost.

The Requirement of schedule: the need to compare and record the milestone and scheduled date.

Measurable outcome: the outcome of applying this method, must be measurable to know the performance.

Predictable: the outcome needed to show the future trends.

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<sup>3</sup> PMBOK® Guide Fifth Edition

<sup>4</sup> PMBOK® Guide Fifth Edition

<sup>5</sup> PMBOK® Guide Fifth Edition

Attributes	Requirement of cost	Requirement of schedule	Measurable Outcome	Predictable	Ranking
Requirement of cost		0	0	0	0
Requirement of schedule	1		0	0	1
Measurable Outcome	1	1		1	3
Predictable	1	1	0		2
Most important attribute: Measurable outcome					

Ranking		Relative Ranking
0	Requirement of measuring cost	The Level of Effort> Discrete Effort>Apportioned Effort
1	Requirement of measuring time	Discrete Effort> >Apportioned Effort>The Level of Effort
3	Measurable Outcome	Discrete Effort>Apportioned Effort> The Level of Effort
2	Predictable	Apportioned Effort>Discrete Effort> The Level of Effort
Recommendation: Discrete Effort		

Based on the simple analysis above, the author’s perspective is that normally, discrete effort is a part of WBS, because it focuses on the individual work, and therefore it is easy to record and compare the time and cost; however, the apportioned effort is a work package, and it provides an overall view about the future trends about the contract performance.

(Attention: the outcome would be different according to different needs. Here is an example to show how it works in the real project. The readers are supposed to do the analysis aligns with the organization needs.)

**CONCLUSIONS**

To draw a conclusion, measuring contract is an important part in managing, planning, and controlling a project, and this paper gives thoroughly perspectives in Using EVPM to measure the contract performance; the processes and the outcome of EVPM.

Then the author gives a simple example about how to use MADM to make the best choice, and how to choose EVPM’s three method in the given circumstance.

## FOLLOW ON RESEARCH

The use of EVPM is still needed to dig deeper, and applied in other fields, to measure the performance. The central idea about EVPM is ‘earned value’, which could possibly be used to measure human achievement, for instance, HR use this tool to evaluate the employee. The author will do more research to meet that challenge.

Also, the analysis of using MADM is not sufficient to help readers to have a clear recognize about choosing the method, as well as the solutions. Regarding this, the author will focus on solutions and suggestion about tailoring EVPM in different situations.

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